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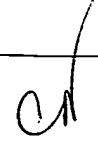


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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,765	11/26/2003	Edward J. Woo	59084US002	9715
32692	7590	09/20/2004		
3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			EXAMINER NGUYEN, GEORGE BINH MINH	
			ART UNIT 3723	PAPER NUMBER
DATE MAILED: 09/20/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/723,765	Applicant(s) WOO, EDWARD J. 	
	Examiner George Nguyen	Art Unit 3723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>022604 and 080904</u> . | 6) <input type="checkbox"/> Other: ____ |

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DETAILED ACTION

Receipt is acknowledged of the IDS filed on February 26, 2004 and August 09, 2004 which have been considered and placed of record in the file.

Claims 1-20 are presented for examination.

This application has been filed with formal drawings which are accepted to the examiner.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stoetzel et al.'5,851,247 in view of Costas et al.'6,679,928 and Material Handbook'pages 281-282.

With reference to the Abstract, col. 3, lines 15-29, col. 13, lines 38-63, Stoetzel discloses the claimed invention except for a sulfonate or sulfate anionic surfactant.

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Method of Abrading a Workpiece

One aspect of this invention pertains to a method of abrading a mild steel workpiece. This method involves bringing into frictional contact the abrasive article of this invention with a workpiece having a mild steel surface. The term "abrading" means that a portion of the metal workpiece is cut or removed by the abrasive article. Abrasive articles according to the present invention provide an enhanced cut when abrading mild steel workpieces under medium pressure in processes in wet conditions.

[57]

ABSTRACT

The present invention is directed to a structured abrasive article that provides an enhanced cut rate and extended productive life when abrading mild steel workpieces. This abrasive article includes a backing having a surface that contains precisely shape abrasive composites. In this invention, the abrasive composites include a binder, abrasive particles, water-insoluble metal silicate particles and a coupling agent. The selection of the combination of these components or materials in an abrasive composite provides an abrasive article having an enhanced cut rate and extended productive life when used to abrade, finish or grind mild steel, particularly under wet conditions using water or water treated with rust inhibiting agents.

Depending upon the application, there may be a liquid present during abrading. The liquid can be water, water containing conventional rust inhibiting compounds, or an organic compound, such as a lubricant, oil, or cutting fluid.

Depending upon the application, the force at the abrading interface can range from about 0.1 kg to 1000 kg. Generally, this range is from about 1 kg to 500 kg of force at the abrading interface.

The abrasive articles of the present invention can be used by hand or used in combination with a machine. At least one or both of the abrasive article and the workpiece is moved relative to the other during grinding. The abrasive article can be converted into a belt, tape roll, disc, or sheet. For belt applications, the two free ends of the abrasive sheet are joined together and a splice is formed.

In a fifth aspect of the present invention a method of abrading a mild steel workpiece using the novel structured abrasive articles encompassed above is provided. The term "mild steel" means carbon steel with a maximum of about 0.25% carbon. This process provides an enhanced cut rate of a mild steel workpiece when a surface of the mild steel workpiece frictionally contacts or is abraded with the abrasive articles described above. The enhancement in cut rate and extended or prolonged productive life of the abrasive article when abrading, finishing or grinding mild steel workpieces is observed under wet conditions. Typical wet conditions include abrading, finishing or grinding mild steel workpieces in the presence of water or water which is treated with conventional rust inhibiting agents.

With reference to col. 4, lines 9-60, Costas discloses that it is known to have utilized a sulfate anionic surfactant in a polishing composition to polish a metal workpiece. Please further note that sulfate anionic surfactant such as dodecylbenzene sulfonates is a well-known synthetic detergent as disclosed by Material Handbook - thus an excellent lubricant.

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10 The terminology, surfactant, is interpreted to mean, a surface active agent that adsorbs to a surface and lowers a surface tension of a liquid on the surface. According to an embodiment, a surfactant comprises, an anionic surfactant as distinguished from a cationic surfactant, and as distinguished from a neutral charge surfactant.

15 According to another embodiment, a surfactant comprises, a sulfonate surfactant comprised of molecules having at least six carbon atoms, as distinguished from a sulfonate comprising molecules having an insufficient number of carbon atoms to exist as a polymer in the polishing composition.

20 According to another embodiment, a surfactant comprises, an alkali metal organic sulfonate. An embodiment of the polishing composition contains 0.1-5% by weight of an alkali metal organic sulfonate surfactant. Preferably, the alkali metal of the alkali metal organic sulfonate surfactant is selected from sodium, potassium and lithium and the organic group is an aliphatic group having 2-16 carbon atoms. One preferred surfactant is sodium octane sulfonate. Other useful surfactants are potassium octane sulfonate, lithium octane sulfonate and sodium dodecyl sulfonate.

25 Appropriate other anionic surfactants include, sulfates, phosphates and carboxylates in place of or in combination with the aforementioned sulfonate surfactants.

30 It is theorized that a combination of the corrosion inhibitor and the surfactant provides a relatively large reduction in metal removal rate with relatively small reductions in downforce applied by the polishing pad on the metal being polished. Where the metal layer is relatively higher in elevation than the metal in trenches, the downforce is relatively higher, and the metal removal rate is maximized by the polishing composition having the combination of the corrosion inhibitor and the surfactant. Where the metal layer is relatively low in elevation, including the metal in trenches being relatively low in elevation, the downforce is relatively lower, and the combination of a metal corrosion inhibitor and a surfactant, adsorbs on the metal in trenches on which the relatively lower downforce is applied, to minimize the removal rate of the metal in trenches, as would tend to be provided by the carboxylic acid polymer and the applied downforce without the combination of the metal corrosion inhibitor and the surfactant. Thus, dishing is minimized due to the minimized removal rate of the metal in trenches.

35 Further, the higher elevations are removed at a higher removal rate than that of the lower elevations, which means that planarization is attained quickly during a CMP operation. Planarization refers to a smooth, planar polished surface with minimized elevation differences on the polished semiconductor substrate, as provided by CMP.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the polishing method of Stoetzel et al.'247 with a aniotic surfactant as taught by Costas and the Material Handbook to further enhance the cut rate and extend the productive life of the abrasive tool.

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Please also note that the test results, found in pages 11-13, would have been expected since the fact that sulfate anionic surfactant is an excellent lubricant – thus inherently extending the productive life of the abrasive tool.

Regarding to claims 10-15, the steps are obvious mere variation of the operation since Applicant has not stated any criticality of the step sequencing.

Regarding to claim 2, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilized the surfactant set forth in the claim, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding to claims 8 and 9, Costas teaches these limitations on col. 5, lines 2-6.

Regarding to claim 17, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected the workpiece set forth in the claim, since it has been held to be within the general skill of a worker in the art to select a known workpiece on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding to claim 20, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided perforations in the disc, since the examiner takes Official Notice that it is well-known to provide perforations on the abrasive disc in order to cool the tool during the polishing due to friction.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pedersen et al.'872 discloses compositions having sulfonate surfactant and process for cleaning and finishing hard surfaces. Chen et al.'677 discloses abrasive lubricant layer comprising sulfonate surfactant for photographing element. Christianson et al.'119, '988, and Lamphere et al.'111 discloses composite abrasive article and emthod of its use.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Nguyen whose telephone number is 703-308-0163. The examiner can normally be reached on Monday-Friday/630AM-300PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Hail can be reached on 703-308-2687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

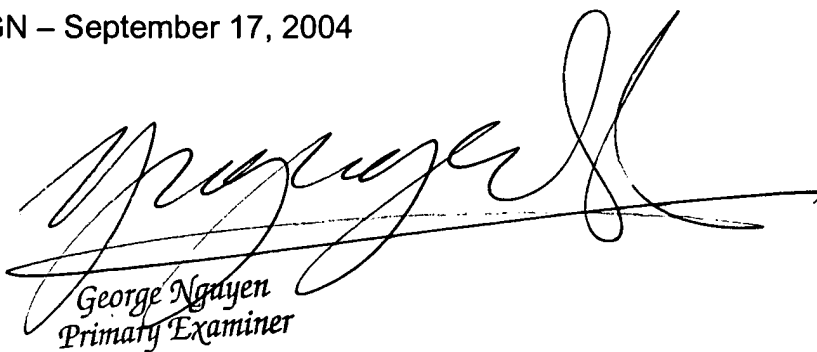
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Primary Examiner
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GN – September 17, 2004



George Nguyen
Primary Examiner